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THE CONTROL OF STORAGE ROTS OF MATURE-GREEN TOMATOES IN NOVA SCOTIA[1]

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Abstract

Field sprays of a mixture of thiram and maneb or tank-mix zineb consistently gave some control of storage rots of mature-green tomatoes. Other mixtures gave-variable results. The dominant microorganisms causing rots of stored tomatoes were: Colletotrichum coccodes (Wallr,) Hughes and Alternaria tenuis Nees.

Introduction

At the present time tomatoes have a very short storage life and must be marketed soon after they are harvested. Extending the storage life of mature-green tomatoes would be advantageous to the tomato industry. Eaves and Lockhart (1) found that tomatoes could be held in controlled atmospheres for an extended period but concluded that fungal decay was the major limitation to prolonged storage.

In 1960 and 1961 tomatoes were stored to determine the effects of different fungicide spray programs for the control of storage rots. The results obtained are given in this paper.

Methods

Tomatoes of the variety Stokesdale were obtained from the fungicide plots previously described by Harrison (2). Each treatment was replicated 4 times in a randomized block design. Fungicidal sprays were applied when an infection period by the late blight organism appeared imminent, In 1960 four applications were made between July 22 and September 15, inclusive, and in 1961 six applications between July 10 and September 11, inclusive. The tomatoes for storage were picked in the mature-green stage on September 30 and October 12, 1960, and on September 12 and 20, 1961. Twenty-five tomatoes were harvested from each plot on each picking date and stored at 53°F for 5 weeks in single layers on trays (18 x 36 in.) lined with brown paper. 'The tomatoes were examined at weekly intervals and all fruits showing rot were removed from the trays. Isolation and identification of unknown rots were made on potato-dextrose-agar. A thermograph recorded the field temperatures during September and October.

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Table 2. Storage rots in the first and second pickings of Stokesdale tomatoes from spray plots at the end of 5 weeks in storage at 53" F in 1961.

Fungicide per 100 gallons	Total per cent rots		Per cent rots caused by C. coccodes		Per cent rots caused by A. tenuis	
	1st	2nd	1st	2nd	1st	2nd
Maneb, 2 lb.	14 bc[2]	14 bc	8 bc	9 c	3 a	3 a
" 1 lb. + thiram, 1 lb.	9 bc	13 bc	3 bc	8 c	2 a	3 a
" 1 lb. + Dyrene, 1 1/4 lb.	7 bc	17 bc	4 bc	13 bc	1 a	3 a
" 2 lb. + thiram, 2 lb.	6 bc	8 c	3 bc	4 c	1 a	3 a
Zineb (factory mix), 2 lb.	9 bc	16 bc	5 bc	13 bc	4 a	1 a
" 2 lb. + Dyrene. 1 3/4 lb.	8 bc	10 c	6 bc	8 c	0 a	1 a
" 1 lb. + thiram, 1 lb.	11 bc	13 bc	5 bc	5 c	4 a	6 a
Zineb (tank-mix nabam, 1 qt. + 3/4 lb. zinc sulphate)	10 bc	7 c	6 bc	4 c	3 a	2 a
" full strength + Dyrene. 1 3/4 lb.	5 bc	10 c	1 c	5 c	2 a	2 a
" full strength + thiram, 2 lb.	3 c	10 c	1 c	4 c	1 a	3 a
Ziram, 2 lb. alternating with Bordeaux 10-7-100	12 bc	13 bc	9 bc	7 c	2 a	3 a
Blitox[1], 3 lb.	26 a	22 b	22 a	19 b	4 a	2 a
Control	16 ab	37 a	13 b	32 a	2 a	3 a

[1] 50% copper as the oxychloride.

[2] Small letters indicate Duncan's Multiple Range grouping of treatments which do not differ significantly at the 5% level.

Results and Discussion

The effects of the various fungicide schedules on storage rots in 1960 and 1961 are shown in Tables 1 and 2 respectively, Less total rot developed in 1961 than in 1960. This difference was largely due to the higher incidence of Alternaria rot in 1960 (Table 1). The decrease in rots may have been due to the Increased number and more regular applications of fungicides in 1961. Another factor that may have influenced the incidence of Alternaria rots was low field temperatures. According to McCollock and Worthington (3) low temperatures favor the development of Alternaria rots in tomatoes. In 1960 a minimum temperature below 40" F occurred on 6 different days whereas in 1961 the minimum temperature never dropped below 40°F.

The dominant microorganisms causing rots of stored tomatoes were: Colletotrichum coccodes (Wallr.) Hughes and Alternaria tenuis Nees. Microorganisms of lesser importance were: Botrytis cinerea Pers. ex Fr., Sclerotinia sp., Phoma destructiva Plowr., Fusarium spp., Penicillium spp., Mucor sp., and bacteria.

The results in Tables 1 and 2 show some significant differences in the control obtained with the various fungicide schedules. Thiram combined with the higher rates of maneb or the full strength tank-mix zineb gave the most consistent control of the various rots, These schedules also give good control in the field of late blight and Botrytis grey mold (2). The alternating program of ziram and Bordeaux gave a significant reduction of anthracnose in the second picking of 1961 (Table 2). Blitox was unsatisfactory and in most other schedules the results varied between the two years and the two picking dates. In spite of the variable results obtained on the effect of fungicides on storage rots,, there is some indication that the storage life of tomatoes can be lengthened by the use of suitable fungicides in the field,

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